

Spectroscopic Insights into Dynamics and Control in Quantum and Energy Materials

Organizers: Tim Lian, Lili Wang, and Jiaojian Shi
August 24-27, 2026

Monday AM

Advanced Techniques for Dynamics Across Time and Length Scales

McCormick Place Convention Center W184a
L. Wang, S Li, *Presiding*

8:00 AM. Opening Remark.

8:05 AM. Atomic-scale optical spectroscopic probing of N-heterocyclic carbene chemistry on metal and two-dimensional material surfaces. **N. Jiang**

8:35 AM. Toward bond-specific chemistry: New opportunities at the single-molecule level with infrared-integrated scanning tunneling microscopy. **S. Li**

9:05 AM. Development of heterodyne detection of interface-specific two-dimensional electronic spectroscopy (HD-i2D-ES). **Y. Rao**

9:35 AM. Giant chiral magnetoelectric coupling in the van der Waals multiferroic NiI_2 . **F.Y. Gao**, X. Peng, X. Cheng, E. Viñas Boström, D. Kim, R. Jain, R. Sankar, S. Lee, M. Sentef, T. Kurumaji, x. li, P. Tang, A. Rubio, E. Baldini

9:50 AM Intermission.

10:05 AM. Attosecond probing of spin, carriers, phonons, and coherence. **S.R. Leone**

10:35 AM. *In-situ* multi-probe X-ray transient absorption spectroscopy captures new catalytic-site intermediates in iridium blue dimer water oxidation catalysts. **J. Huang**

10:55 AM. Probing ultrafast dynamic processes in photocatalysts via time resolved X-ray absorption spectroscopy. **A. Narayanan Nair**

11:10 AM. Magnetic control of excited-state pathways in donor-bridge-acceptor molecules. **T. Mani**

11:30 AM. Electrically switchable ferron dynamics and ferron-mediated nonlinear upconversion. **J. XIAO**

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Monday PM

Light-Induced Collective Dynamics in Quantum Materials

McCormick Place Convention Center W184a

F. Y. Gao, *Presiding*

2:00 PM. Opening Remark.

2:05 PM. Driven quantum materials: Controlling emergent phenomena away from equilibrium. **A. Cavalleri**

2:35 PM. Visualizing and optimizing materials pathways. **A. Lindenberg**

3:05 PM. Multidimensional ultrafast spectroscopy of materials, from THz to x-rays. **S.L. Johnson**

3:35 PM. Probing coherent chiral phonons with visible light and x-rays. M. Biggs, (. Ho, M. Lutz, A. Elliott, C. Allington, U. Staub, **J.A. Johnson**

3:55 PM. Intermission.

4:05 PM. Exciton sensing of correlated electrons, spins, and dipoles. **X. Zhu**

4:35 PM. Collective optical response and interference effects of molecular layers at metallic interfaces. Z. Zhou, M. Sukharev, J. Subotnik, **A. Nitzan**, W. Ying

5:05 PM. Ultrafast optical creation and dynamics of polar supertextures. **V. Gopalan**, V. Stoica, J. Freeland, H. Wen, A. Lindenberg, L. Martin

5:35 PM. Tracking collective dynamics by ultrafast X-ray diffraction and THz spectroscopy. **H. Wen** (Presented by V. Stoica)

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Tuesday PM

Strong Light–Matter Coupling and Polariton Dynamics

McCormick Place Convention Center W182

J. Shi and L. Wang, *Presiding*

2:00 PM. Opening Remark.

2:05 PM. H-bond dynamics under confinement. **W. Xiong**

2:35 PM. Designed photonic platforms for controlling molecular photophysics. **M. Sfeir**

3:05 PM. Molecular spectroscopy and dynamics under strong light-matter coupling.
M.L. Weichman

3:35 PM. Long-lived polaritonic coherence and polaron decoupling effects in 2D electronic spectra. **P. Huo**

3:50 PM. Intermission.

4:10 PM. Non-Born Oppenheimer approaches to chemistry. **J.E. Subotnik**, N. Bradbury, L. Peng, **T. Qiu**, X. Bian, x. wu, T. Duston, Z. Tao (Presenter T. Qiu on behalf of J.E. Subotnik)

4:40 PM. Ultrafast and cavity control of correlated and topological quantum materials.
M. Claassen

5:10 PM. Anomalous spectroscopic features induced by molecular disorder in strongly coupled light-matter systems. **H. Chen**, W. Li

5:25 PM. Developing tools for electronic strong coupling in molecular cavities: from continuum theory to solution-phase polariton lasing. **S. Gunasekaran**, A. Musser

5:40 PM. Linear and nonlinear vibrational excitation driven by molecular polaritons.
W. Ying, C.M. Bustamante, F.P. Bonafé, R. Richardson, M. Ruggenthaler, M. Sukharev, A. Rubio, A. Nitzan

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Wednesday AM

Spin Dynamics and Spin-Dependent Phenomena in Materials

McCormick Place Convention Center W184d

J. D. Gaynor, *Presiding*

8:00 AM. Opening Remark.

8:05 AM. Recent progress in predicting the spectroscopic properties of materials for quantum technologies and for energy conversion. **G.A. Galli**

8:35 AM. Colossal anisotropic absorption of spin currents in chiral materials. **D. Sun**

9:05 AM. Chemical design of symmetry-enabled and symmetry-forbidden photophysical responses in quantum materials. **A.M. Rappe**

9:35 AM. Tuning ultrafast spin dynamics in halide perovskites. **X. Chen**

9:50 AM. Intermission.

10:10 AM. Ultrafast thermal spectroscopy of interfacial energy transfer. **S. Zare**

10:25 AM. Decoupling coherent electron phonon interactions in metal organic chalcogenides. **H. Yang**

10:40 AM. Electronic spin-dependent dynamics and optical properties of metal nanoclusters. **K.L. Knappenberger**

11:10 AM. Spectroscopic elucidation and control of spin dynamics in lead halide perovskite. **L. Wang**

11:30 AM. Understanding vibronic dynamics in the chirality-induced spin-selectivity effect with ultrafast nonlinear spectroscopy. A. Seys, G. Christenson, **J.D. Gaynor**

11:45 AM. Engineering paramagnetic spin centers in metal-free organic frameworks. **R. Ghosh, A. Paul**

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Wednesday PM

Non-Equilibrium Dynamics in Energy and Quantum Materials

McCormick Place Convention Center W184d

J. Shi, L. Wang, *Presiding*

2:00 PM. Opening Remarks.

2:05 PM. Ultrafast symmetry-breaking charge separation in chromophore single crystals leading to long free carrier lifetimes. G.C. Mantel, K. Peinkofer, R. Young, **M.R. Wasielewski**

2:35 PM. Imaging exciton transport and quantum interactions with ultrafast microscopy. **L. Huang**

3:05 PM. Chiral energy transfer dynamics. **G.S. Engel**

3:35 PM. Multidimensional coherent spectroscopy of excitons in transition metal dichalcogenide monolayers. **S. Cundiff**

4:05 PM. Intermission.

4:20 PM. Bath-driven formation and control of decoherence-protected excitonic subspaces in perovskite quantum materials. **P. Kambhampati**

4:50 PM. Intersystem crossing kinetics of near infrared absorbing thiosquaraine upconversion photosensitizers for photovoltaics. **C.W. Schlenker**

5:10 PM. Quantum dot blinking revisited: First-order kinetics with distributed rates correct the power law model. D. Herath, Y. Hu, K.L. Wustholz, H. Yang, **P. Snee**

5:30 PM. Resolving planar and interfacial charge transfer in 2D organic semiconductors. N. Okey, **A. Bhattacharjee**

5:45 PM. Direct experimental observation of ligand–exciton coupling across fine structure states in quantum dots through two-dimensional electronic–vibrational spectroscopy. **W.R. Jeffries**, M.H. Khalil

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Thursday AM

Non-Equilibrium Dynamics in Energy and Quantum Materials

McCormick Place Convention Center W184d

A. Bhattacharjee, *Presiding*

8:30 AM. Opening Remarks.

8:35 AM. Facilitating energy transfer with strongly coupled interfaces. **S.T. Roberts**

9:05 AM. Are exciton dynamics in thin films representative of actual solar cells?
Addressing the question using artifact-free ultrafast 2D photocurrent spectroscopy.
M.T. Zanni (Dasol Im presenting on behalf of M.T. Zanni)

9:35 AM. Vibronic reaction coordinates from coherences. **S.R. Rather**

9:50 AM. Intermission.

10:10 AM. Quantum coherence in a perylene-based metal-organic framework for potential solid-state qubits. **T.G. Goodson**

10:40 AM. Ultrafast optical pump-probe instrument for resolving and controlling rapidly changing transition states in photoexcited systems. **J. Moses**

11:10 AM. Effects of low frequency vibrational modes and non-Condon factors on the energy gap law behavior of nonadiabatic transitions. **S.J. Jang**

11:30 AM. Light-induced spin qubit pair generation in quantum dot-organic molecule conjugates. **J. Niklas**, M.Y. Teferi, M.L. Tang, J.H. Olshansky, O. Poluektov

11:45 AM. Interpreting interfacial VSFG spectra through a DFT/MD framework for molecular orientation and mode-specific response. **H. Yoon**, K. Kwak, M. Cho

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